Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (cancelled)

2. (previously presented) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to the host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a cache memory;

wherein there are separate point-to-point data paths between each one of the directors and the cache memory and

including a backplane and wherein the cache memory and the directors are interconnected through the backplane.

3. (original) The system recited in claim 2 wherein the backplane is a printed circuit board.

4. (previously presented) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to the host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a cache memory;

a data transfer section coupled to the plurality of first directors, the second

directors, and the cache memory;

a messaging network coupled to the plurality of first directors and the plurality of second directors, such first and second directors controlling data transfer between the host computer and the bank of disk drives in response to messages passing between the directors through the messaging network as such data passes through the memory via the data transfer section;

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

5. (original) The system recited in claim 4 including a backplane and wherein the cache memory and the directors are interconnected through the backplane.

6. (original) The system recited in claim 5 wherein the backplane is a printed circuit board.

7. (previously presented) The system recited in claim 4 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

8. (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first directors and second directors, such message network being operative independently of the data transfer section;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first

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directors and the second directors through the messaging network to facilitate data transfer between first directors and the second directors with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

9. (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

10. (previously presented) The system interface recited in claim 9 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

11. previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

12. (previously presented) The system interface recited in claim 11 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

13. (previously presented) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

14. (previously presented). A system interface comprising:

a plurality of directors

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

15. (previously presented). The system interface recited in claim 14 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

16. (previously presented) The system interface recited in claim 14 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

17. (previously presented) The system interface recited in claim 16 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

18. (previously presented) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the host computer and the bank of disk drives in response to messages passing between at least a pair of the plurality of first and second directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

19. (previously presented) The system interface recited in claim 18 wherein each one of the first and second directors includes:

a data pipe coupled between an input of such one of the first and second directors and the cache memory;

a controller for transferring the messages between the message network and such one of the first and second directors.

20. (previously presented) The system interface recited in claim 18 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

21. (previously presented) The system interface recited in claim 20 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the

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cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

22. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

23. (previously presented) The system interface recited in claim 22 wherein each one of the directors include:

a data pipe coupled between an input of such one of the directors and the cache memory;

a controller for transferring the messages between the message network and such one of the directors.

24. (previously presented) The system interface recited in claim 22 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

25. (previously presented) The system interface recited in claim 23 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the

cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

26. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors, such message network being operative independently of the data transfer section;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

27. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

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28. (previously presented) The system interface recited in claim 27 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

29. (previously presented) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network coupled to the plurality of directors;

wherein the first and second directors control data transfer in response to messages passing between the directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

30. (previously presented) The system interface recited in claim 29 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

31. (currently amended) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such messages by-passing

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the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section;

wherein the messaging network passes the messages from any of the plurality of directors to a selected one of the plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

32. (currently amended) A system interface comprising:

a plurality of directors

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the directors control data transfer in response to messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section;

wherein the messaging network passes the messages from any one of the plurality of directors to a selected one of the plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

33. (previously presented) The system interface recited in claim 32 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

34. (previously presented) The system interface recited in claim 32 wherein the messaging network comprises a switch network having a plurality of ports, each one of the

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ports being coupled to a corresponding one of the plurality of directors.

35. (previously presented) The system interface recited in claim 32 wherein each one of the directors includes:

a data pipe coupled between an input of such one of the directors and the cache memory; and

a controller for transferring the messages between the message network and such one of the directors.

36. (currently amended) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

a plurality of first directors coupled to host computer/server;

a plurality of second directors coupled to the bank of disk drives;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors;
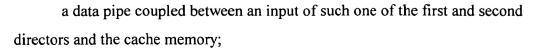
wherein the first and second directors control data transfer between the host computer and the bank of disk drives in response to messages passing between at least a pair of the plurality of first and second directors through the messaging network with such data passing through the cache memory in the data transfer section;

wherein the messaging network passes the messages from any of the first plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

37. (previously presented) The system interface recited in claim 36 wherein each one

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of the first and second directors includes:

> a data pipe coupled between an input of such one of the first and second directors and the cache memory;
>
> a controller for transferring the messages between the message network and such one of the first and second directors.

38. (previously presented) The system interface recited in claim 36 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

39. (previously presented) The system interface recited in claim 38 wherein each one of the directors includes:

> a data pipe coupled between an input of such one of the directors and the cache memory; and
>
> a controller for transferring the messages between the message network and such one of the directors.

40. (new) A data storage system for transferring data between a host computer/server and a bank of disk drives through a system interface, such system interface comprising:

> a plurality of first directors coupled to the host computer/server;
>
> a plurality of second directors coupled to the bank of disk drives;
>
> a cache memory;
>
> a data transfer section coupled to the plurality of first directors, the second directors, and the cache memory;
>
> a messaging network coupled to the plurality of first directors and the plurality of second directors, such first and second directors controlling data transfer between the host computer and the bank of disk drives in response to messages passing between the directors through the messaging network as such data passes through the memory via the data transfer section;
>
> wherein the messaging network passes the messages from any of the first

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plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

41. (new) The system recited in claim 40 including a backplane and wherein the cache memory and the directors are interconnected through the backplane.

42. (new) The system recited in claim 41 wherein the backplane is a printed circuit board.

43. (new) The system recited in claim 40 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

44. (new) A system interface comprising:
   a plurality of first directors;
   a plurality of second directors;
   a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;
   a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first directors and second directors, such message network being operative independently of the data transfer section;
   wherein the messaging network passes messages from any of the first plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors;
   wherein the first and second directors control data transfer between the first directors and the second directors in response to the messages passing between the first

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directors and the second directors through the messaging network to facilitate data transfer between first directors and the second directors with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

45. (new) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section;

wherein the messaging network passes the messages from any of the first plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

46. (new) The system interface recited in claim 45 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

47. (new) A system interface comprising:

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a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network coupled to the plurality of first directors and the plurality of second directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section;

wherein the messaging network passes the messages from any of the first plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

48. (new) The system interface recited in claim 47 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors.

49. (new) A system interface comprising:

a plurality of first directors;

a plurality of second directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of first and second directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of first and second directors;

wherein the messaging network passes messages from any of the first plurality of directors to a selected one of said second plurality of directors and from any one of the second plurality of directors to a selected one of the first plurality of directors;

wherein the first and second directors control data transfer between the first directors and the second directors in response to the messages passing between the first directors and the second directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

50. (new) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the messaging network passes messages from any one of the plurality of directors to a selected one of the plurality of directors;

wherein the directors control data transfer in response to the messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

51. (new) The system interface recited in claim 50 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.

52. (new) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network comprising a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors, such message network being operative independently of the data transfer section;

wherein the messaging network passes messages from any one of the plurality of directors to a selected one of the plurality of directors;

wherein the directors control data transfer in response to the messages passing between the directors through the messaging network with such data passing through the cache memory in the data transfer section; and

wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

53. (new) A system interface comprising:

a plurality of directors;

a data transfer section having a cache memory, such cache memory being coupled to the plurality of directors;

a messaging network, operative independently of the data transfer section, coupled to the plurality of directors;

wherein the messaging network passes messages from any one of the plurality of directors to a selected one of the plurality of directors;

wherein the directors control data transfer in response to the messages passing between the directors through the messaging network with such messages by-passing the data transfer section and with such data transfer comprising passing data through the directors to the cache memory in the data transfer section; and

. wherein there are separate point-to-point data paths between each one of the directors and the cache memory.

54. (new) The system interface recited in claim 53 wherein the messaging network comprises a switch network having a plurality of ports, each one of the ports being coupled to a corresponding one of the plurality of directors.